REMARKS

Applicant concurrently files herewith a Petition and fee for a Two-month Extension of Time and an Excess Claim Fee Payment Letter for excess claims.

Claims 1-7 and 13-23 are all the claims presently pending in the application. Claims 8-12 have been canceled. New claims 13-23 have been added to more completely define the invention.

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art, narrowing the claim in view of the prior art, or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The attached pages are captioned "**Version with markings to show changes made**".

With respect to the prior art rejections, claims 1, 2 and 4-7 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Shindo, et al. (JP 4-14261)(hereinafter "Shindo").

Claim 1-3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakazawa, et al. (JP 4-171779) (hereinafter "Nakazawa").

These rejections are respectfully traversed in the discussion below.

I. THE CLAIMED INVENTION

Applicant's invention, as defined for example in independent claim 1, is directed to a thin film transistor having a back channel electrode (e.g., used in an active matrix type liquid crystal display panel in a non-limiting embodiment).

A feature of the invention is that a voltage of a front channel positioned on the side of a gate wiring of the thin film transistor may be made equal to a voltage of the back channel positioned on the side of a back channel electrode by short-circuiting the back channel electrode to a gate electrode through a contact-hole provided in a portion of a semiconductor

layer forming the thin film transistor.

A further feature of the invention, as defined by dependent claim 2, is that the back channel electrode may be formed of the same material of a pixel electrode (e.g., such as that of a transparent electrode) connected to one of a source electrode and a drain electrode of the thin film transistor.

With such features, a thin film transistor can be provided which is capable of reducing leakage current of a back channel when it is operated continuously (e.g. see page 3, lines 12-15; page 10, lines 7-27; page 11, lines 1-5; page 12, lines 17-27; and page 13, lines 1-7).

An exemplary configuration of the thin film transistor with a back channel electrode is shown in Figs. 2-3 of the application.

The conventional systems, such as those discussed below and in the Related Art section of the present application, do not have such a structure, and fail to provide for such an operation.

Indeed, such features are clearly not taught or suggested by the cited references.

II. THE PRIOR ART REFERENCES

A. The Shindo Reference

The Examiner asserts:

> *[regarding claim 1] Shindo et al. disclose in figs. 2 and 3 a thin film transistor having a back channel electrode 8a, wherein a voltage of a front channel positioned on the side of a gate wiring of said thin film transistor is made equal to a voltage of said back channel positioned on the side of a back channel electrode by short-circuiting said back channel electrode to a gate electrode 2 through a contact-hole 7a formed in a location remote from an active region of said thin film transistor by at least five microns (as in claim 4) provided in a portion of a semiconductor layer 10 constituting said thin film transistor.*
>
> *As to claim 2, Shindo et al. disclose (see figs. 2, 3 and 11) a back channel electrode 8a formed of the same material as a material of a pixel electrode 18b connected to one of source*

and drain electrodes.

As to claim 5, Shindo et al. disclose id fig. 3 a passivation film 9 patterned to have a width equal to that of said back channel electrode and said semiconductor layer are provided between said back channel and said gate insulating film 3.

As to claim 6, Shindo et al. disclose in fig. 8 a semiconductor layer patterned to have a width equal to that of said source and drain electrodes of said thin film transistor is provided between said source and electrodes and said gate insulating film 3.

As to claim 7, Shindo et al. disclose in fig. 9 a semiconductor layer having an ohmic contact layer on the side thereof, which is in contact with said source and drain electrodes.

However, Applicant respectfully disagrees and submits that the Examiner's assertions are erroneous.

Firstly, regarding the rejection of claim 1, Shindo discloses in Fig. 1 that the potential of a channel portion 4 of a thin film transistor should be kept to a fixed potential such as a ground level. However, Shindo nowhere teaches or suggests the "*back channel electrode*" of the present invention.

That is, in Fig. 2 and Fig. 3 of Shindo, the electrodes 8a and 8c cannot be called a "*back channel electrode*", as in the claimed invention. Indeed, electrodes 8a and 8c are lead electrodes to be connected to external terminals (not shown), respectively. Thus, it is clear that the Examiner's assertions that Shindo anticipates the claimed invention are erroneous.

Further, even if an electrode 18c, as that shown in Figs. 10-12 of Shindo, were to correspond (arguendo) to a back channel electrode of the claimed invention, the electrode 18c is not connected to a gate electrode 12. Thus, Shindo does not teach or suggest "*short-circuiting said back channel electrode to a gate electrode*", as in the claimed invention. Instead, as shown in Figs. 10-12 of Shindo, only a lead electrode 18a (e.g., a drain electrode) is connected to the gate electrode 12.

With respect to the Examiner's rejection of dependent claim 2 , Shindo nowhere discloses or suggests applying a transistor to a liquid crystal display panel. Accordingly, neither a pixel electrode nor a transparent electrode is disclosed or suggested by Shindo. Moreover, the electrode 18b shown in Fig. 11 of Shindo is only referred to as a lead electrode.

Also, Applicant respectfully submits that the Examiner's remarks with regards to the rejection of claims 5 and 6, are erroneous. That is, Shindo nowhere discloses "*a passivation film patterned to have a width equal to that of said back channel electrode and said semiconductor layer are provided between said back channel and said gate insulating film*", as in dependent claim 5.

Further there is no teaching or suggestion in Shindo that a "*semiconductor layer patterned to have a width equal to that of said source and drain electrodes of said thin film transistor is provided between said source and drain electrodes and said gate insulating film*", as in dependent claim 6.

Hence, turning to the clear language of independent claim 1 (and similarly in new independent claims 13-17), Shindo neither teaches or suggests "*[a] thin film transistor including: a back channel electrode, wherein a voltage of a front channel positioned on the side of a gate wiring of said thin film transistor is made equal to a voltage of said back channel positioned on the side of a back channel electrode by short-circuiting said back channel electrode to a gate electrode through a contact-hole provided in a portion of a semiconductor layer forming said thin film transistor*" (emphasis Applicant's).

For the reasons stated above, claims 1, 2, and 4-7 (and new claims 13-23) of the claimed invention are fully patentable over the cited references.

B. The Nakazawa Reference

The Examiner asserts:

> *[regarding claims 1-3] Nakazawa discloses in fig. 1 a thin film transistor having a back channel electrode 108, a gate electrode 102 a semiconductor layer 104 constituting said thin film transistor.*
>
> *Although the prior art does not specifically disclose a contact hole through which a back channel electrode is short-circuited to a gate electrode so that a voltage of a front channel positioned ed on the side of a gate wiring of said thin film transistor is made equal to a voltage of a back channel position ed on the side of a back channel electrode, it would have been*

obvious to one skilled in the art at the time the invention was made to connect the back channel elected to the gate electrode via a through hole to control the characteristics of a large on to off ratio and a large on current to off current ratio. As to claim 2 Nakazawa discloses in figs. 1 and 2 a back channel electrode 108 is formed of the same material as a material of a pixel electrode 205 connected to one of a source and drain electrodes of said film transistor.

However, Applicant again respectfully disagrees.

Specifically, Nakazawa discloses in Fig. 1 and Fig. 5 that a first gate electrode 102 is connected to a second gate electrode 108. However, no contact hole is indicated in either Fig. 1 or Fig. 5 (and as admitted by the Examiner on page 4 of the Office Action). Thus, Nakazawa does not teach or suggest a voltage of a front channel is made equal to a voltage of a back channel "*by short-circuiting said back channel electrode to a gate electrode through a contact-hole provided in a portion of a semiconductor layer constituting said thin film transistor*", emphasis Applicant's).

Further, even assuming that a transparent electrode (ITO) for the second gate electrode 108 may be disclosed, there is no disclosure or suggestion by Nakazawa of the second gate electrode 108 and a pixel electrode 205 being formed with the same material, as defined by dependent claim 2.

Hence, turning to the clear language of independent claim 1, Nakazawa does not teach or suggest "*[a] thin film transistor including: a back channel electrode, wherein a voltage of a front channel positioned on the side of a gate wiring of said thin film transistor is made equal to a voltage of said back channel positioned on the side of a back channel electrode by short-circuiting said back channel electrode to a gate electrode through a contact-hole provided in a portion of a semiconductor layer forming said thin film transistor*" (emphasis Applicant's).

Further, regarding dependent claims 2-3, when combined with independent claim 1, recite novel and non-obvious features.

In addition, new claims 13-23 are also fully patentable by virtue of the novel and unobvious features and limitations which they recite.

Further, the other prior art of record has been reviewed, but it too even in combination

(arguendo) with Nakazawa and Shindo fails to teach or suggest the claimed invention.

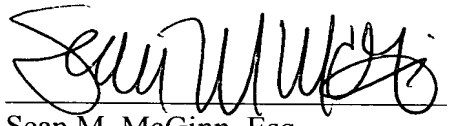
III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-7 and 13-23, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 8-12 have been canceled without prejudice or disclaimer.

The claims have been amended as follows.

1. (Amended) [In a] A thin film transistor [having] including:

a back channel electrode, wherein a voltage of a front channel positioned on the side of a gate wiring of said thin film transistor is made equal to a voltage of said back channel positioned on the side of a back channel electrode by short-circuiting said back channel electrode to a gate electrode through a contact-hole provided in a portion of a semiconductor layer [constituting] forming said thin film transistor.

5. (Amended) A thin film transistor as claimed in claim 1, wherein a passivation film patterned to have a width equal to that of said back channel electrode and said semiconductor layer are provided between said back channel and [said] a gate insulating film.

6. (Amended) A thin film transistor as claimed in claim 1, wherein said semiconductor layer patterned to have a width equal to that of [said] source and drain electrodes of said thin film transistor is provided between said source and drain electrodes and [said] a gate insulating film.

7. (Amended) A thin film transistor as claimed in claim 1, wherein said semiconductor layer has an ohmic contact layer on the side thereof, which is in contact with [said] source and drain electrodes.

New claims 13-23 have been added.